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STORAGE IN FLAXSEED MARKETING.

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Abstract Bibliography of Selected References and Sources of Data

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INTRODUCTION

This preliminary report presents under one cover information which heretofore was available only from widely scattered sources. It is not intended to represent a complete or balanced bibliography covering all aspects of flaxseed marketing. The references abstracted were selected because of their bearing on flaxseed storage problems and practices, or on aspects of flaxseed marketing problems that appear to be closely related to flaxseed storage.

Over nine-tenths of the U. S. flaxseed crop is produced in the Northern Plains States. On commercial family-operated farms in this area a greater proportion of the cropland is devoted to flaxseed than any other crop except wheat. Consequently, a considerable amount of the research on flaxseed has concerned such production problems as adapted varieties, increased yields, more uniform growth and ripening characteristics, or improved resistance to rust, pasmo, and other diseases. Not only to farmers but also to country elevator operators who assemble and ship grain to market, however, flaxseed is often of secondary importance as a source of income. Therefore, even in the principal Northern Plains

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1/ Special Crops Section, Marketing Research Division, AMS (December 1954).

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producing region, a relatively limited amount of research has been or is being devoted to economic aspects of marketing, storing, conditioning, or processing flaxseed.

From farms to processors, flaxseed is marketed as a grain crop. Consequently, reference is made to standard textbooks on marketing agricultural products or on agricultural prices for perspective on the grain market structure and functions, including trading in grain futures contracts at central market exchanges. Reference is made also to selected U. S. Department of Agriculture publications for more detailed information on appropriate marketing functions and problems, and for research methods used in previous studies of various aspects of farm storage and farmers' economic responses. 2/

Sources consulted included (1) the Card Catalog, U. S. Department of Agriculture Library; and (2) Bibliography of Agriculture, July 1942 to date, covering research published as far back as the mid-1930's. The directors of agricultural experiment stations in all flaxseed producing States were contacted with respect to published and current research in flaxseed storage and marketing by their staffs, including workers in agricultural economics, marketing, agronomy, and agricultural engineering.

Flaxseed Storage Problems. The search of literature and sources of data was conducted to obtain and evaluate published information and data relating to five major aspects of flaxseed storage problems. The problems include (1) the relative economic advantage to producers of

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2/ The list of additional references, pages 16 and 17, is limited to those that appear directly useful to studies in flaxseed storage and marketing.

storing flaxseed at harvest for later sale, compared with selling at harvest time; (2) the comparative advantages and cost (including shrinkage and changes in grade) of storing flaxseed at country elevators or on farms; (3) the effect of the length and the conditions of storage on changes in grade factors and oil quality of the flaxseed occurring during storage, together with the significance of these grade and quality changes in terms of their relation to processing loss for flaxseed and refining loss for linseed oil; (4) the adequacy of available market place storage for flaxseed at country assembly points, terminals, and processing plants; and (5) the comparative cost and advantages, to industry and to potential national security needs, of carrying Government-owned stocks as flaxseed or as linseed oil.

ABSTRACT BIBLIOGRAPHY OF SELECTED REFERENCES ON FLAXSEED STORAGE AND MARKETING

The following references are arranged alphabetically by author within groupings of six broad subject-matter categories: Conditioning, grades and inspection, prices, quality, stocks, and supply. References listed under "grades" relate to studies dealing largely with the characteristics of the flaxseed that affect its commercial trading or pricing, as dockage, moisture content, and damaged seed. References listed under "quality" relate to studies dealing largely with the characteristics of the linseed oil (or the oil fraction of the unprocessed flaxseed), as iodine number or acid value; or with the nature or problems of expressing the oil from the seed or refining the crude oil so produced.

Conditioning

Davenport, [illegible], Hall, [illegible], and Sorenson, J. W.
1952. *Drying and Storing Flaxseed in South Texas.* Tex. Agr. Expt. Sta. Progress Report 1352, 7 pp. April

(A more detailed report on the same work is contained in the Sorenson-Davenport *Agricultural Engineering* article below.)

Pederson, Harold C.
1952. Artificial Drying of Grain is Increasing. Minn. Agr. Ext. Service *Minnesota Farm Business Notes*, No. 348, December 31.

Of 31 million bushels of grain handled June 1951 to May 1952 by 74 Minnesota elevators, 1.6 million bushels were flax; of 12 million bushels dried artificially, 12,000 bushels were flax. Only 2 elevators reported drying flax, and only 3.3 percent moisture was removed from flax, compared with 3 percent or less for wheat, oats, barley, soybeans, and rye - and 11.4 percent for corn. Fixed costs of drier installations at 72 elevators ran:

Item	Unit	Group I	Group II	Group III	Group IV	All
No. of elevators....	No.	(27)	(31)	(9)	(5)	(72)
Av. volume dried....	1,000 bu.	64	176	320	495	168
Fixed costs per bu.						
Depreciation.......	dol.	2.10	.73	.52	.55	.81
Interest...........	"	.93	.27	.18	.22	.31
Taxes..............	"	.22	.08	.06	.07	.10
Insurance..........	"	.24	.06	.05	.06	.08
Total..............	"	3.45	1.16	.81	.89	1.30
Repairs............	"	.04	.05	.12	.07	.08

Sorensen, J. W., Jr., and Davenport, M. G.
1951. Drying and Storing Flaxseed in Texas. Agr. Engineering 32(7): 379-382, July.

"Flax harvest in Southern Texas (273,000 acres in 1949) starts in latter April-early May, the period of highest humidity and rising temperatures. Excess moisture at harvest time and unsatisfactory methods of storage often lead to serious deterioration. Germination and chemical properties of flaxseed were not impaired by artificial drying with air temperatures up to 175 degrees. Though 7 to 9 percent moisture flaxseed was stored in sacks without loss in germination, 8 percent moisture was found too high for bulk storage. Flaxseed was stored in both bulk and sacks without serious increase in acid number, though seed temperatures above 86 to 88 degrees over prolonged period caused reduction in germination."

Grade and Inspection

Cox, Rex W., and Brockins, W. W.
1943. Dockage in Flaxseed. Minn. Agr. Expt. Sta. Bul. 373, 12 pp.

"Purpose is to present the prevalence and economic significance of the dockage problem in various flaxseed-producing areas of Minnesota and to show how flax producers' financial returns may be increased through improved weed control.

"During the crop season 1941-1942, 9797 carloads of flaxseed received at Minneapolis from Minnesota, the Dakotas, and Montana (84 percent of the total from Minnesota) averaged 11.3 percent dockage, ranging from 3 to 37 percent. One-third of the cars had less than 10 percent, one-half 10 percent to 15 percent, and one-fifth 15 percent or more, of dockage.

"During the August-November 1942 period, 4891 cars of flax received at Minneapolis from Minnesota show a significant reduction in the amount of dockage although weed infestations were much more serious in flax in the latter year . . . this may be due to cleaning of high dockage flax before shipment. There is no evidence to indicate any material improvement in dockage from 1921-24 seasons to 1930-31, 1934, or 1941 seasons. Crop reporting districts, and shipping points within a county also vary significantly.

"Records from 276 farmers in 15 flaxseed producing counties show 15 percent with dockage from 20 to 70 percent. The 25 percent of farms with less than 10 percent dockage compares closely with the proportion of all shipping points in the state in this class; the high-dockage group of farms is correspondingly much higher, indicating that high-dockage flax is cleaned at country shipping points.

"Removal of all weed seeds and foreign material generally results in a shrinkage of at least 15 percent to 20 percent from the original amount of flax, both sound and broken flaxseeds being

removed in the cleaning. [illegible] Dakota indicate that the loss in flax yield [illegible] outweighs any weed control benefit [illegible]

Dillman, A. C., and Black, R. H.
[illegible] Moisture Content of Flaxseed and Its Relation to Harvesting, Storage, and Crushing. U. S. Dept. Agr., Bur. Plant Ind. [illegible] Mimeo. 14 pp. Sept. (Processed.)

"In tests in September 1928 the higher moisture content of flaxseed from the combine than from the standing flax indicated that the threshed seed took up moisture from the weed seeds and chaff present in the combine samples. The average moisture content of the weed seeds (chiefly green foxtail, lambs-quarters and amaranthus) in the dockage was 15.7 percent.

"After flaxseed containing dockage is placed in storage, transference of moisture from the weed seeds to the flaxseed continues until there is equilibrium of moisture in the various contiguous seeds. Ordinarily when such balance of moisture is reached the dockage contains from 1 to 3 percent more moisture than the flaxseed.

"The Grain Division, Bureau of Agri. Economics found that car lots of flaxseed containing from 10.1 to 10.5 percent of moisture sometimes spoil in transit in warm weather, and that damage frequently occurs when the flaxseed contains more than 10.5 percent moisture. Flaxseed containing from 10 to 11 percent moisture may be considered safe for storage unless exposed to high humidity or to high temperature. In some years hundreds of cars of flaxseed too wet for safe storage are shipped to market."

Flor, H. H.
1943. Seed Treatment of Flax. N. Dak. Agr. Expt. Sta. Bimonthly Bul. 5(5):23-26. May.

"Large seeded varieties and yellow-seeded varieties are more subject to cracking and breakage during threshing than small brown-seeded varieties. In Canada, 1942 experiments showed increased emergence following Ceresan treatment of flax containing mechanically injured seed. In the spring of 1942, 74 lots of North Dakota flaxseed--random selections from lots sent in by producers for purity and germination tests--showed 50 to 62 percent whole seed, less than 3 percent broken but 30 percent to 42 percent cracked seed. A high proportion of cracked and broken seed was found to occur when threshing is done in very dry weather."

Machacek, J. E., and Brown, A. M.
1942. Preliminary Investigations on Mechanical Injury to Flaxseed. Phytopathology 32(8): 733-734. August.

"Examination of a large number of flaxseed samples in 1940 showed that practically all from the Canadian Prairie provinces were so damaged through seed-cracking that, on the average, about half the seeds failed to germinate, although seed samples from Eastern

Canada showed no injury. The cracking of the seed was observed to occur during threshing and was likely to be most severe when threshed in very dry weather. Many samples grading high in commerce were found to be badly damaged. Large-seeded varieties seemed more subject to injury than small-seeded. Ordinarily the cracks were invisible to the naked eye but sometimes indicated by broken or chipped seeds."

Ryan, John A.
1951(?) Production and Marketing of Flax in Texas. Tex. Ind. Series No. 1, U. of Texas, Bur. Bus. Admin., Austin, 71 pp.

"Storage is the main problem in Texas. The high relative humidity and susceptibility of flaxseed to moisture make control (of deterioration) difficult. When flaxseed is stored in a hot, humid climate for more than 3 months, some deterioration is probable. Storage periods greater than 3 months also cause the fatty acids to increase with reduction in quality of the oil."

1949. U. S. Dept. Agr. Handbook of Official Grain Standards of the United States. Production and Marketing Adm.

"Flaxseed shall be any grain which, before the removal of dockage, consists of 50 percent or more of flaxseed and not more than 10 percent of other grains for which standards have been established.

Grade requirements summarized:

Grade number	Minimum test weight per bu.	Maximum limits of Damaged flaxseed	Moisture
1	49 pounds	20 percent	11 percent
2	47 pounds	30 percent	11 percent
Sample grade*			

* Sample grade shall include flaxseed which does not come within the requirements of either grade No. 1 or No. 2, or which contains fire-damaged flaxseed or more than 11 percent moisture; or which is musty, or sour, or heating, or hot; or has any commercially objectionable foreign odor; or is otherwise of distinctly low quality.

"Dockage shall include all matter other than flaxseed which is contained in the lot of grain as a whole; also undeveloped shriveled and small pieces of flaxseed removed with the dockage and which cannot be recovered by properly rescreening and recleaning. The quantity of dockage shall be calculated in terms of percentage based on the total weight of the flaxseed including the dockage; and shall be stated in terms of a whole percent, fractions disregarded. The word 'Dockage' together with the percentage thereof shall be added to the grade designation.

"Each determination of test weight, moisture, damage and 'other damaged' shall be on basis of grain after removal of that part of dockage which can be removed readily by the use of appropriate sieves and cleaning devices. All other determinations on basis of grain as a whole.

"Damage flaxseed shall be seeds and pieces of flaxseed which are heat damaged, sprouted, frosted, badly ground damaged, badly weather damaged, or otherwise materially damaged."

Prices

Benton, Alva H.
1933. Hedging Grain by Farmers' Elevators--Gains and Losses. N. Dak. Agr. Expt. Sta. Bul. 272. 42 pp.

Contains studies on hedging of flax by individual elevators for 4 seasons commencing 1925-26, showing volume of flax handled, volume of futures and gross trading profits.

Peterson, Weber H.
1942. Wheat and Flax Prices Received by Farmers in North Central and North Eastern South Dakota. 1890-1940. South Dak. Agr. Expt. Sta. Cir. 37, 16 pp.

"Purpose is threefold: To supply price data by areas, to analyze briefly their effects on South Dakota farmers, to aid the farmer in deciding whether to store or sell cash grain crops at harvest time. In the case of neither wheat nor flax does the seasonal price appear large enough to justify increased storage operations by farmers if this involves building additional storage capacity. There was no appreciable difference in earning capacity of wheat and flax in those areas which produce both."

Ratcliffe, Harry E.
1933. Flaxseed--Factors Influencing Prices in North Dakota. N. Dak. Agr. Expt. Sta. Bul. 268, 37 pp.

"Based on technical analysis for 10-year period beginning September 1922, most important factors influencing or associated with flax prices were demand for linseed oil, flaxseed supplies in Argentina and, during fall, probable size of new crop in Argentina."

Quality

Dillman, A. C., and Hopper, T. H.
1943. Effect of Climate on Yield and Oil Content of Flaxseed and on Iodine Number of Linseed Oil. U. S. Dept. Agr. Tech. Bul. 844, 69 pp. April.

"Well known that growth and physiological development of flaxseed, including yield and drying quality of the oil, are affected to a marked degree by environmental conditions, especially by temperature

and soil-moisture supply. Purpose of the experiments reported herein, covering 4 varieties of flax and 1 to 10 [illegible] stations, to determine more definitely the effect of weather conditions on development of the flax plant and formation of oil in the seed. Among other findings, the correlations between percentages of the different fatty acids in the oils and July temperatures during the oil-formation period are negatively correlated with linolenic acid and positively correlated with saturated and oleic acids, though the coefficients were small."

Nesbitt, L. L., Pinckney, A. J., Stoa, T. E., and Painter, E. P.
1943. Oil Formation in Flaxseed. N. Dak. Agr. Expt. Sta. Tech. Bul. 325, 19 pp. April.

Presents data relating to changes in oil constituents of seed from flax plants harvested at regular intervals after full bloom.

Painter, E. P., and Nesbitt, L. L.
1943. Stability of Linseed Oil During Storage of Flaxseed. N. Dak. Agr. Expt. Sta. Bi-monthly Bul. 5(6): 36-40, July.

"It is known that flax respires at a rapid rate. Lillevik and Geddes found high carbon dioxide concentrations in flax storage bins. Deaths of workers, probably due to the replacement of oxygen by carbon dioxide in the atmosphere of the storage bins, have occurred. The possibility that fatty acids might be utilized in respiration occurs; also owing to its chemical instability it seems likely that linseed oil would undergo chemical reactions when flaxseed is stored. In those samples where the iodine number decreased most the percentage of cracked seeds and injured seed coats was much higher than in those samples which showed no apparent change in iodine number. Although our storage conditions were not strictly comparable to farm bins or elevators, it seems reasonable to assume that changes in the oil are insignificant when flaxseed is stored. Average loss in iodine number: 17 lots from Northern Plains States and Canadian locations, ranging from 174 to 192 iodine number in 1936 (first determination), lost 1.8 points to 1943 (second determination); 38 lots from Northern Plains and Pacific States and Canada, ranging from about 169 to 200 iodine number in 1936, lost 0.8 points to 1941; 4 lots from Brookings, South Dakota, ranging from 174 to 177 iodine number in 1938, lost 4 points to 1941; 6 lots from Edmonton, Alberta, ranging from 191 to 197 iodine number in 1939, lost 0.1 points to 1941."

U. S. Dept. Agr.
1954. Sound Grain Fat Acidity Survey--1953 Crop. Agr. Mktg. Serv., 20 pp. April. (Processed.)

"Most of the 1952 and 1953 crop flaxseed samples had fat acidity values of less than 40. As in the previous report the 3 1952-crop samples with fat acidity values of more than 60 were found to have very low germination values and could therefore not be considered

fully sound. The limiting fat acidity value of 40 [illegible] seed should be considered quite tentative in view of the unexplained observation that 45 percent of the samples of the 1951 crop exceeded this value."

Tabular summary:

Item	Crop of—			
	1951	1952	1953	3 crops
Number of samples	24	25	39	88
Number of points of origin	8	5	11	-
Fat acidity:				
Average	64.2	55.8	21.1	42.7
Maximum	268.7	320.4	42.4	320.4
Minimum	14.0	10.7	7.4	7.4
Percentage of samples considered sound (fat acidity below 40)	42	80	97	77

Stocks

Allen, S. G.
1954. Inventory Fluctuations in Flaxseed and Linseed Oil, 1926-39. Econometrica 22(3): 310-328. July.

"The behavior of economic units engaged in the production and distribution of flaxseed and linseed oil in the United States is summarized in a system of linear stochastic equations. The latter contains such jointly dependent, observable economic variables as production, stocks, and consumption of the above commodities. The particular equation system studied reflects the investigator's desire to explain quarterly inventory fluctuations in these commodities and is formulated in the light of market conditions prevailing during the period 1926-1939. Evaluating the estimates by their performance in a post-sample period was approached . . . but structural equations specified do not admit the wider range of economic experience of World War II and postwar periods . . . the technology of production as well as the influences underlying consumption of linseed oil changed and the conditions of world flaxseed supply changed. Primarily for the latter reason no claim of predictive usefulness under present conditions is made for the estimates of these equations."

Kromer, George W., and Gilliland, C. B.
1954. Processing the Three Major Oilseeds. U. S. Dept. Agr., Agr. Mktg. Serv., Marketing Research Report No. 58, 38 pp. April.

"Receipts of flaxseed at the oil mills for the 5 crops 1947 through 1951 ranged from 66 to 107 percent of flaxseed produced,

averaging 83 percent. In the 1950-51 season, [illegible] exceeded domestic production, the excess coming from carry-over stocks mainly as Government-owned stocks were released from seed to oil. In the 1951-52 season, the average monthly crush for soybeans and flaxseed was 83 percent of the peak month crush, but only 50 percent for cottonseed, partly because of greater excess crushing capacity in the cottonseed industry and that cottonseed is not a readily storable commodity.

"Flaxseed stored at oil mills represented only a small part of the total stored in the 1951-52 season. The bulk was stored on farms and at country elevators. Stocks at oil mills ranged from 1 to 3 times the average crush. Peak storage in December 1951 showed 7 million bushels on hand. The relatively good storability of flaxseed, except in Texas where the production is small, contributes to uniform operation of the processing plants."

Supply

Elliott, F. F., and Wells, O. V.
1930. Farmers Response to Price in the Production of Flax. U. S. Dept. Agr., Bur. Agr. Econ., 33pp. (Processed.)

"Flax production in the U. S. confined largely to the 4 hard spring wheat States, Minnesota, North and South Dakota, and Montana. During 1910-1929 variability in acreage averaged 31.5 percent. Changes in acreage were affected by relative yields and relative prices of flax and wheat with the amount depending in part on the position flax occupies in the rotation and in part the price sensitiveness of the producers. The larger the proportion of total returns obtained from the crop, the more rapid the change. Relative-acre-returns ratio measures effect both of physical factors and (through price) of economic conditions.

"Changes in U. S. flax acreage 1910-29 most closely related to combined ratio of acre value of flax to acre value of wheat (1) taken at time of seeding and (2) averaged with that taken during the marketing period. A flax-wheat ratio of 108 to 100 indicates no-change point for flax acreage. In 18 of the 20 years studied the movement of the acre-return ratio correctly forecast the direction of flax acreage change in the following planting season; and in only 2 years did the amount of change differ by more than 8 percent from the estimate, which accounted for about 95 percent of variation in flax acreage.

"The same general relationships were found for individual States, with the amount of unexplained variation higher and the no-change ratio higher in the 2 States nearer the Minneapolis and Sioux City marketing centers, lower in the 2 States farther away.

"Since relative profitability of flax with alternatives in a preceding year is no criterion of profitability in the current year--and since price relationships existing at seeding time may not

prevail at harvest time--farmers should [illegible] their production alternatives on the basis of prospective price conditions from Outlook reports, applying such information to long-time relative yields of flax and competing crops."

Hansen, Peter L., and Highell, Ronald L.
1947. Oil Crops in American Farming. U. S. Dept. Agr., Tech. Bul. No. 940, 55 pp. November.

"Over the years flaxseed production in the U. S. has shifted geographically, but the principal flaxseed-growing States continue to be Minnesota and North Dakota, with South Dakota next in importance. Although flaxseed still remains a relatively minor crop, in areas where alternative choice of crops is limited, flaxseed will probably be grown even at relatively low prices. Estimates made for each of the flaxseed growing States of probable future acreage, yield and production of flaxseed for each of 3 price situations expressed as ratios of flaxseed to wheat prices of 2.5, 2.0, and 1.5, show that such relative price changes would probably produce rather wide differences in production."

Hopper, T. H., and Johnson, Muriel
1941. Flax Production and Climate of North Dakota, 1919-1937. N. Dak. Agr. Expt. Sta. Bul. 298, 71 pp.

Presents data by crop reporting districts on acreage, yield and production of flaxseed in North Dakota and Minnesota for 1919-1937, with full weather data for corresponding years. For period 1930-37, data showing range of oil content and iodine number, with correlations developed between seasonal weather factors and yield and iodine number of linseed oil.

1941. Flax Production and Climate of North Dakota and Minnesota, 1919-1937. N. Dak. Agr. Expt. Sta. B. 298. 72 pp.

"The oil content of commercial flaxseed is negatively correlated with temperature, but significantly related to variety and the loss of lighter weight, low oil content seed in the threshing and cleaning operations.

"The iodine number, or relative drying quality, of linseed oil is positively correlated with yield and precipitation, and negatively and highly significantly correlated with July temperatures.

"For the 19-year period the average annual abandonment of all spring wheat acreage seeded was 12.5 percent compared with 15.4 percent for all flax in the U. S. Abandonment has been large for both crops for the 1931-37 period because of deficiencies in moisture and excessive temperature. These conditions were more severe in North Dakota than in Minnesota, where abandonment of seeded acreage has been small."

Peterson, Weber H.
1947. Flaxseed in American Farming. U. S. Dept. Agr. Tech. Bul. No. 938, 62 pp.

"The purpose of this study is to examine the supply position of flaxseed in the U. S. about 1955, after demand has settled down to a stable peacetime situation; to determine the competitive position of flaxseed as compared with alternative crops in the major flaxseed areas; and to estimate the probable acreage and production pattern.... The procedure . . . to consider several alternative demand and price situations, and to estimate the probable production of flaxseed under each . . . provides more information within a probable range of demand conditions. . . After the supply position for flaxseed was explored for each of the alternatives, the domestic demand and foreign trade situations for flaxseed were analyzed and a tentative balancing of positions that might prevail under favorable economic conditions (was made.)"

Thompson, Ned O.
1946. Economics of Flax Production in Kansas. U. S. Dept. Agr., Bur. Agr. Econ. and Kans. Agr. Expt. Sta., 24 pp. (Processed.) Datelined Lincoln, Nebr.*

"Purpose to determine probable future of acreage and production of flax in Kansas under different price, supply, and demand conditions, to determine how flax fits in the farming systems in the area, trends in yields and returns from flax as compared with alternative crops, and the influence of other factors on flax production. Increased emphasis on livestock and especially dairy cattle in Southeast Kansas would mean less land available for flax and other cash crops; trend toward larger farms aided in expansion of flax acreage (proportion of farms growing flax increases with size of farm and with mechanization as measured by ownership of tractors and combines)."

* Apparently prepared while the author was assigned as cooperative agent at Kansas Agr. Expt. Station, Manhattan, Kansas, and published after he was transferred to Nebraska Agr. Expt. Sta., Lincoln, Nebr.

SELECTED SOURCES OF DATA ON FLAXSEED
STORAGE AND MARKETING

General

Banna, Antoine
1954. Oilseeds, Fats and Oils, and Flour Products, 1909-53. U. S. Dept. Agr. Stat. Bul. No. 147.

Contains tables for flaxseed showing acreage planted and harvested, supply, disposition and price per bushel to farmers commencing 1912; outturn, wholesale price and value of oil and meal per bushel crushed commencing 1926; season average price received by growers commencing 1909. For linseed oil, supply and disposition annually commencing 1919, and monthly commencing 1946; details of supply, disposition and utilization commencing 1912; monthly wholesale prices commencing 1926. For linseed meal, monthly wholesale prices commencing 1919; supply, disposition and utilization commencing 1948.

U. S. Dept. Agr.
1953. Agricultural Statistics (Annual)

Contains tables for flaxseed showing production and farm disposition, by States, current and previous years; inspected receipts by grade, by crop year commencing 1943; supply and distribution annually, 10 most recent crop years; quarterly stocks on farms and off farms, commencing 1947; crushings, oil and meal outturn, foreign trade and prices of linseed oil and linseed meal, annually, commencing 1943 crop year.

1954. Fats and Oils Situation. Washington, D. C. and earlier issues. Published bimonthly. (Processed.)

Contains current information similar to the above sources.

U. S. Bureau of the Census
1919-54. Facts for Industry, Animal and Vegetable Fats and Oils. Series M-17. (Annual.)

1919-54. Facts for Industry, Fats and Oils. Series M-17. (Monthly.)

Contain data on receipts, crushings, and stocks of oil-bearing materials at oil mills; production shipments and stocks of primary products except crude oil at oil mill locations; production, consumption and factory and warehouse stocks of primary materials and of secondary products.

U. S. Bureau of the Census
1931-54. Facts for Industry, Fats and Oils, Consumption by Uses. Series M-17. (Monthly.)

Inspection

U. S. Dept. Agr., Prod. and Marketing Admin. and Ext. Service
1943-1953. Annual Summary of Inspections and Grading of Carlot Receipts of Flaxseed.

Prices

U. S. Dept. Agr., Agr. Marketing Service
1954. Grain Market News and Statistical Report (Weekly)

Flaxseed prices, cash Minneapolis, and U. S. average farm prices.

1954. Agricultural Prices. (Monthly) and earlier years.
Average farm prices, by States.

U. S. Dept. Agr., Commodity Exchange Authority
1954. Trade in Grain Futures (Monthly) and earlier years.

Contains data on trading and prices for futures contracts of various maturities currently being traded.

Stocks

U. S. Bureau of Agr. Economics
1952. Farm Stocks of Grains, Oilseeds and Hay, 1944-51. Revised estimates, by States. (Quarterly.)

1951-1954. Flaxseed and Soybean Stocks. (Quarterly.)

Contains current data on off-farm stocks, by market level and by States, in January, April, July, and October issues. Commencing 1954, issued by Agr. Marketing Service.

1952. Crop Production. (Monthly.)

Contains current data on flaxseed and grain stocks on farms, quarterly, in January, April, July, and October issues. Issued commencing 1954 by Agr. Marketing Service.

1951. Stocks of Grains and Oilseeds in Off-farm Positions, by States, quarterly, 1944-51.

Contains flaxseed series commencing 1947.

Supply

U. S. Dept. Agr., Agr. Mktg. Service.
1954. Grain Market News and Statistical Report. (Weekly.)

Contains current supply and distribution data, quarterly. For earlier years, quarterly Flaxseed Market Summary, U. S. Dept. Agr., Prod. and Marketing Adm., and Quarterly Flaxseed Review, U. S. Dept. Agr., War Food Administration.

ADDITIONAL REFERENCES ON RELATED ASPECTS OF STORAGE AND MARKETING OF OILSEEDS AND GRAINS

Pamphlets

(1) Agnew, Donald E., Rollefson, Arthur M., and Keirstead, C. H.
1951. Improving Soybean Marketing Through Farm Storage. U. S. Dept. Agr. Info. Bul. No. 57, 28 pp.

(2) Collier, George A.
1949. Grain Production and Marketing. U. S. Dept. Agr., Misc. publ. No. 692, 78 pp.

(3) Hall, Thomas E., Hemphill, P. V., Meyer, C. H., and Davis, W. K.
1951. Where and How Much Cash Grain Storage for North Dakota Farmers. U. S. Dept. Agr., Farm Credit Adm. Bul. No. 61, 52 pp.

(4) Sabin, Archie R.
1950. Marketing Channels and Margins for Soybeans and Soybean Products in Illinois, Crop Years 1947 and 1948. U. S. Dept. Agr., Bur. Agr. Economics, 24 pp. October. (Processed.)

(5) Shedd, Claude K., and Cotton, R. T.
1949. Storage of Small Grains and Shelled Corn on the Farm. U. S. Dept. Agr. Farmers Bul. No. 2009, 35 pp.

(6) Stokes, Donald R.
1947. Marketing Margins and Costs for Grains, Grain Products, and Dry Edible Beans. U. S. Dept. Agr. Tech. Bul. No. 934, 90 pp.

(7) Wells, Orvis V.
1932. Farmers' Response to Price: A Selected Bibliography. U. S. Dept. Agr., Bur. Agr. Economics, 8 pp. (Processed.)

Books

(8) Clark, Fred E., and Weld, L. D. H.
1932. Marketing Agricultural Products in the U. S. MacMillan, New York, 672 pp.

(9) Foote, Richard J., and Thomson, Frederick L.
1952. Agricultural Prices. McGraw-Hill, New York, 509 pp.

(10) Johnson, D. Gale
1947. Forward Prices for Agriculture. U. of Chicago Press, Chicago, 259 pp.

(11) Larson, Adlowe L.
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